Empty Operators and Parasitic Gaps

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Compare Chomsky's (1982) *Concepts and Consequences* (C&C) story about parasitic gaps with the account of parasitic gaps in his (1986) *Barriers*. In C&C, the concern is

> with structures of the form (57) (order irrelevant), where α is a *filler* and t is a *gap* associated with this filler by normal processes (that is, independently of the presence of e), while e is a gap that is not licensed independently of (α, t) (it is not the gap of some filler):
>
> (57) ...α... t...e... (order irrelevant)
>
> The gap t "licenses" e in the sense that it assigns α as the filler of e. (Chomsky (1982:40))

In *Barriers*, on the other hand, the licensing conditions on parasitic gaps are characterized in terms in terms of a "composed chain".

> (130) If $C = (\alpha_1,...,\alpha_n)$ is the chain of the real gap and $C' = (\beta_1,...,\beta_m)$ is the chain of the parasitic gap, then the "composed chain"
>
> $$(C,C') = (\alpha_1,...,\alpha_n, \beta_1,...\beta_m)$$
>
> is the chain associated with the parastic gap construction and yields its interpretation. (Chomsky (1986: 56,63; (130))

Two major proposals in *Barriers* for the licensing conditions on the composed chain (C,C') are (A) a requirement that α_n not c-command β_1, a proposal

yielding a theory much like that in C&C, or (B) a requirement that β_1 be 0-subjacent to α_n. Each account of course has a number of different consequences.

There are two different problems for the *Barriers* story about parasitic gaps that I note here. First, the composed chain seems to be peculiar to the parasitic gap construction. Parasitic gaps are explicitly mentioned in the characterization in (130), and this goes counter to the criterion Chomsky set in C&C for theories aboaut parasitic gaps: There should be no theory of parasitic gaps. The parasitic gap phenomenon should follow for free from other learnable parts of the grammar. Second, although it is noted frequently that the anti-c-command theory has several advantages, there does not seem to be any strong principled reason to prefer the anti-c-command condition on the composed chain over the 0-subjacency requirement.

In this article I offer a principled reason to prefer the anti-c-command condition over the 0-subjacency option, and an account of the parasitic gap construction that is not peculiar to the parasitic gap construction. Thus I will be arguing for a return to something like the C&C account of it. The article is organized as follows. In section 1 I discuss the problem that empty operators cause for the *Barriers* theory, and in section 2 I briefly present a solution for that problem. The proposed solution involves distinguishing among structures that are commonly thought to be all empty operator structures. In section 3 I discuss how the proposed distinction narrows the choice of possible theories that deal with parasitic gaps. Section 4 is for discussion of a couple of consequences, one of which is a problem, the other a payoff; of the distinction drawn among so-called empty operator structures.

1. Empty operators and the problem for *Barriers*

The crucial development for the parasitic gap (PG) story in *Barriers* is the recognition that a constituent containing a PG must be an "empty operator" structure, like that in (1).

(1) a. $[\ O_i\ [\ldots t_i \ldots]]$

b. who$_i$ did you sit beside t_i without $[\ O_i\ [$PRO talking to $t_i\ ]]$[1]

The PG construction then, as Chomsky points out, falls into "the same category as adjective complements, purposive-rationale clauses, and many others that have been extensively investigated in recent years". Examples of some constructions that Chomsky has in mind are the infinitival relative (IR) in (2), the *too/enough*-infinitives (TE) in (3), the object-gap purpose clause (PC) in (4), and the *easy*- infinitive (EI) in (5).

(2) IR here are some boys$_i$ $[\ O_i\ [$PRO to talk to $t_i]\ ]$[2]

(3) TE a. the boys$_i$ are too stubborn $[\ O_i\ [$PRO to talk to $t_i]]$

b. the boys$_i$ are cute enough $[\ O_i\ [$PRO to talk to $t_i]]$

(4) PC we brought them$_i$/John$_i$ over $[\ O_i\ [$PRO to talk to $t_i]\ ]$[3]

(5) EI the boys$_i$ are easy [O_i [PRO to talk to t_i]]

We include only infinitival relatives in this collection to highlight what would be a consequence of the standard, *wh*-movement theory: All of the above infinitives should have exactly the same structures.

In each construction of (2)-(5), the empty operator is licensed in a particular way. The PG problem for the *Barriers* theory stems from the fact that the empty operator in (1b) cannot be licensed in any way similiar to those in (2)-(5). First consider the IR in (2). A standard assumption about the infinitival relative (and relatives in general) is that the relative operator gets assigned a range through some kind of predication relation between the open S relative and the head N (cf. Williams (1980), Chomsky (1982: fn. 11)). In (1b) the empty operator structure is not an open sentence to be predicated within any NP, so this sort of licensing of the empty operator is not available to the PG construction.

Next consider the structures in (3)-(5). A standard assumption about (3)-(5) is Chomsky's (1982, p. 31) supplementation of "the principle barring vacuous operators by the requirement that each LF variable either be assigned a range by its operator or be assigned a value by an antecedent that A-binds it." This principle is generalized in Chomsky (1986b) to the principle of Full Interpretation (FI). The empty operators in (3)-(5) are licensed by a locally binding matrix argument. In (1b), on the other hand, there is no matrix argument to coindex with the empty operator licensing the PG.

The PG construction is apparently unique, subject to licensing conditions that must be characterized for PG alone. These PG-peculiar conditions are defined in *Barriers* on the PG-particular chain composition structure in (130) above.

2. Narrowing the field

A way to improve the picture for the *Barriers* theory would be to show that the licensing condition for the empty operator in the PG structure is not in fact peculiar to that structure, but is shared by some other structure. A more substantial improvement would be to show that the licensing conditions for the empty operator in the PG structure are shared by empty operator structures in general.

In the following two sections we will aim for the substantial improvement. In this section I will first (rather summarily) distinguish the relative operator in IR from the "true", empty operator, then I will argue that PC and EI are not empty operator structures. This will leave PG and TE structures as "true" empty operator structures. We will take up the matter of how to license empty operators in general in section 3.

2.1. The operator in the infinitival relative

Of the structures in (1)-(5), only IR can have lexical material in Comp.[4]

(6) a. IR here's a box [in which$_i$ [to put your articles t$_i$]]
b. PG * into which box did you look before [into which$_i$ [putting your articles t$_i$]]
c. TE i. * this box is big enough [in which$_i$ [to put your articles t$_i$]]
ii. * this box is too small [in which$_i$ [to put your articles t$_i$]]
d. PC * we bought it [in which$_i$ [to put our articles t$_i$]]
e. EI * this box is easy [in which$_i$ [to put your articles t$_i$]]

Moreover, IR is unique among the constructions in (1)-(5) in being predicated of a head N, within the NP constituent.

Thus, the operator in IR can be distinguished from any operators to be found in the other constructions. We will refer to the operator in the IR as a "relative operator", and to obligatorily empty operators simply as "empty operators".

2.2 Purpose clauses and *easy*-infinitives have no empty operators

The original arguments that EI are essentially empty operator structures were made in Chomsky (1977). A similar argument that PC are examples of the operator variable construction is made in Chomsky (1980). While the evidence in favor of empty operator status for PG constructions like (1) and TE structures like (3) is persuasive, the evidence in favor of that status for the PC and EI structures in (4) and (5) is much less so. In the first part of this section I will show why a different categorial status for PC and EI should assumed, and in the second part I will show how it can be done within the general GB framework. In the third part of this section I will present further motivation for the distinction made between PC and EI on one hand and empty operator structures on the other hand.

2.2.1 EI and PC are not made by *wh*-movement One of the diagnostic tests Chomsky (1977) proposes for *wh*-structures (in English) is that "bridge verbs" like *tell* and *think* don't stand in the way of the *wh*- operator and the variable left by Move α. PC and EI straightforwardly fail this test, as was noted by Nanni (1978).

(7) a. IR here's a book to tell the teacher that you're reading e
b. PG this is the man John interviewed t before telling you that you should give the job to e
c. TE i. the job is too insignificant (for us) to insist that they (should) advertise e
ii. the job is important enough (for us) to insist that they (should) advertise e
d. PC * I brought it (for Bill) to say that he is reading e
e. EI * John would be easy (for us) to insist that Bill should meet e [5]

Chomsky (1977) acknowledges the fact that certain empty object constructions fail the "bridge verb" test, but attaches no theoretical significance to it. Let us follow a different tack, and attach some theoretical significance to this fact. If a characteristic of *wh*-structures is that they allow

long distance binding across "bridge verbs", then failure to do so should disqualify a *wh*- structure analysis for that construction.

Fortunately for the general theory there is an alternative way to get the object gaps we need for PC and EI.

2.2.2 A VP analysis for PC and EI *Wh*-movement is a good mechanism for getting a gap in an object position, but it is not the only mechanism available. Consider "Burzio's generalization" (cf. Burzio (1981)), which corelates a failure of external θ-role assignment with a failure of VP-internal Case assignment.

Suppose that PC and EI are neither S′ nor S, that is, that they are not as they were characterized by convention in (4)-(5); but instead are simply VP.[6] Since there is no external argument position in VP, there can be no external θ-role asssignment by the θ-assigners embedded within them. Assume such a failure of external θ-role assignment corelates with a failure of VP-internal Case assignment. The distinctive object gap in PC and EI is now a direct consequence of their formal status as VP.[7]

The obligatorily controlled element in PC and EI, the empty object, shares these characteristics with PRO: (i) it is θ-marked, but (ii) it is not assigned Case. A minimal theory of control would be that as empty (that is, Caseless) θ-marked A-positions, they are subject to the requirement of Full Interpretation, whence the obligatoriness of their control. The empty elements in PC and EI may share a further property with PRO: the domain in which they must find a controller is apparently the same. All of these empty elements find their antecedents in the immediately superordinate governing category, that is, in the immediately superordinate "complete functional complex" (CFC), in the sense of Chomsky (1986b). Chomsky's characterization of CFC is that it is a maximal projection, and "all grammatical functions compatible with its head are realized in it - the complements necessarily, by the projection principle, and the subject, which is optional..." We can conceive of a bare VP constituent like PC or EI as the minimal CFC containing its empty element. That is, we can conceive of the bare VP as the same kind of CFC as a clause containing a morphological passive, a CFC in which a subject argument has simply not been assigned.

What we have developed here is a rough beginning of a theoretically principled account of certain empty elements that do not arise through *wh*-movement. It is now time to demonstrate that an alternate theory of these empty object elements is worth the extra expense.

2.2.3 Corroboration The VP analysis of PC and EI not only explains the failure of "bridge-verb" dependencies in them, it also distinguishes PC and EI from true *wh*-movement structures like IR, PG and TE in a number of other ways.[8]

2.2.3.1 Aspectual *have* If we assume that *wh*-movement structures are obligatorily S′, we would expect the S inside the S′ to have the full aspectual range allowed to S in general. As we can see in (8), however, while the claimed *wh*-structures allow aspectual *have*, PC and EI do not.

(8) a. IR ? here's a (good) book for you to have read e before you finish high school
b. PG ? this is the man John interviewed t before having read the file on e
c. TE i. ? the job was too inconsequential to have advertised e
ii. ? the job was important enough to have advertised e
d. PC * I brought it to have read e
e. EI * John would be easy to have hired e [9]

Takezawa (1984) notes that aspectual *have* is limited to environments in which it is governed by either tense or a modal. As is pointed out in Jones (1985b), assuming tense to be external to VP (in, for example, INFL), the VP analysis of PC and EI is entirely consistent with, and anticipated by, such a restriction on the distribution of aspectual *have*.[10]

2.2.3.2 *There*-insertion Assuming again that *wh*-movement structures must be full S'constituents, and that *there*-insertion constructions are full S clauses, we would expect *there*-insertion structures to be possible in empty operator structures. It has long been noted that PC and EI fail this S test.

(9) a. IR that's a (good) book for there to be lots of copies of e lying around
b. PG this is the man John hired t without there being any pictures of e on file
c. TE i. the job is too inconsequential for there to be a big advertising budget for e
ii. the job is important enough for there to be a big advertising budget for e
d. PC * I brought them for there to be copies of e for everyone
e. EI * John would be easy for there to be a good job for e

2.2.3.3 Obligatoriness of the object gap In the present theory the object gap in PC and EI arises as a direct consequence of their categorial status as VP. The object gaps in IR, the adjunct containing a PG, and TE, on the other hand, arise from *wh*-movement, which is generally considered to be optional. From this difference, we would expect it to be possible for IR and TE to exist without object gaps , and for object gaps within adjuncts to be optional. On the other hand, we would expect PC and EI to be unacceptable without object gaps. This is straightforwardly the case for EI. It is also the case for PC, although the matter bears some discussion, to which we turn after (10).

(10) a. IR here's a guy [e to talk to you]
b. PG that's the article I threw t away before [e talking to you (about it)]
c. TE i. the job is too inconsequential [e to attract any good applicants]
ii. the job is important enough [e to attract some good applicants]
d. PC * we picked it_i up [e_i to stir the soup]
e. EI * John would be easy [e to talk to the children]

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Faraci (1974) distinguishes three kinds of purposive clauses. He discusses the object-gap PC (which we have been calling, and will continue to call when there is no danger of ambiguity, simply PC), a PC with a subject gap, and the *in-order-to* clause (IOT). There are significant differences between these clauses. (i) There are different semantic restrictions on the kinds of VP these clauses can associate with (cf. Faraci (1974), Jones (1985a,b)). (ii) IOT clauses can further be distinguished from PC (both object-gap and subject-gap) by two more characteristics: (a) only the IOT clause is acceptable when its infinitive is preceded by *in order*... , and (b) the controller of the IOT gap is characteristically Agent, while the controller of the PC is characteristically Theme. (iii) As is argued in Jones (1985b), the three kinds of clauses are categorially different. The object-gap PC is a simple VP, subject-gap PC is a simple S and the IOT clause is a S′.

The main point of this section with respect to object-gap PC, that the object-gap is obligatory, would be demonstrated by finding a instance in which both IOT and subject-gap PC are excluded, that is, a construction in which only object-gap PC is possible. Such an example would demonstrate that the object-gap purpose clause cannot be derived from either subject-gap PC or IOT. Hence the object gap of PC (as well as that of EI) is an essential characteristic, and not an option that arises from independent mechanisms. Consider (11).

(11) we picked it$_i$ up [to stir the soup with e$_i$]

The *picked it up* predicate, while apparently semantically compatible with an object-gap PC, is semantically incompatible with subject-gap PC, as can be seen in (12).

(12) * we picked it$_i$ up [e$_i$ to stir the soup]

As for IOT, while the *picked it up* predicate is not incompatible with IOT, as can be seen in (13a), (13b) shows that the IOT reading is not a Theme control reading, indicating (13a) is not a PC reading. Further, (13c) shows that IOT cannot occur with an object gap.

(13) a. we picked it up [in order to stir the soup]
b. we$_j$ picked it$_i$ up [in order e$_{i*/j}$ to stir the soup]
c. * we picked it$_i$ up [in order to stir the soup with e$_i$]

Apparently, a predicate like *picked it up* is semantically compatible only with object-gap PC.[11] There is thus evidence for the existence of an infinitival constituent, object-gap PC, in which there is an obligatory empty object. This is the main point of this section.

2.3 Conclusion

The VP analysis of PC and EI gets several syntactic facts for free, namely, their incompatibility with tensed bridge verbs, aspectual *have*, *there*-insertion, and the obligatoriness of the object gap.[12] The VP analysis is not without its problems and puzzles. We will return to consider some of these in section 4. Of immediate relevance to the present discussion is the fact that the inventory of true empty operator constructions has been cut back to TE and PC.

3. Empty operators and the ECP

Assume that PG constructions and TE constructions together form a class of constructions: true empty operator constructions. It would be, then, reasonable to search for a licensing condition that could characterize both constructions. A reasonable first choice for such a condition would be the independently motivated licensing condition on empty space in general: the Empty Category Principle. The ECP in its general form, (14),

(14) β is properly governed by α if it is governed by α and a certain kind of connection holds between α and β.
(Chomsky (1986):(30))

might be expected to hold of empty operator structures, that is, where β = empty operator. In fact a plausible ECP account of empty operators is obtained if α = (overt) operator. That is, suppose the licensing condition on empty operators is that they must be properly governed by overt operators.

3.1 ECP and TE

The standard assumption about TE is that the infinitives are complements to the lexical items *too* and *enough*. Gueron & May (1984) suggest that *too* and *enough*, as QP, are operators that undergo Move α at LF. In this scheme of things, then, the TE construction can be seen to be an instance in which an operator, *too* or *enough*, lexically, hence, properly, governs the empty operator of the complement.

Empty operators must, at some point, be assigned some range, due to the principle of Full Interpretation. In a case of overt *wh*-movement, where the trace is lexically governed, as in (18a), the interpretation of the trace, i.e. the coindexation that is the result of movement, is independent of the licensing of the trace through lexical government by a governor, γ. So, too, could it be the case with the TE construction, where the empty operator is licensed by lexical government, and independently interpreted, i.e., assigned some range, say, at the level of representation at which the AP containing the TE construction is predicated of the subject NP, as in (15b).[13]

(15) a. *wh*- which boys$_i$ did you [see[γ]] t$_i$
b. TE i. the boys$_i$ are [$_{AP}$ [too[γ]] stubborn [O_i [to talk to t$_i$]]]$_i$
ii. the boys$_i$ are [$_{AP}$ cute [enough[γ]] [O_i [to talk to t$_i$]]]$_i$

3.2 ECP and PG

The ECP requires proper government either by lexical government, or by antecedent government, i.e., binding. Antecedent government is frequently strengthened to be a requirement of subjacent binding. Suppose, however, that the requirement of subjacency arises only in cases where the EC to be properly governed is a trace left by movement. That is, assume that subjacency characterizes syntactic movement, and that it is not built into the ECP, which concerns empty space in general.

A C&C anti-c-command type of scheme for licensing PG can now be proposed for the empty operator in the PG adjunct constituent. As in C&C, the

empty operator binding the PG must itself be bound by a *wh*-operator that could only have arisen by some legitimate *wh*-movement.

(16) who$_i$ did you sit beside t_i without [O_i [talking to t_i]]

3.3 Generalized empty operator licensing

Proper government is an independent characterization of general licensing requirements on empty categories. We have seen that a particular kind of empty category, the empty operator, occurs in structures in which overt operators are in positions of proper government. Let us then consider proper government by an operator to be the requisite condition for empty operator structures.

3.3.1 PC and EI versus PG and TE PC and EI differ from PG in that neither PC nor EI necessarily occurs within a *wh*-movement structure. Thus a general antecedent government story is not available for PC and EI.

Interestingly, PC and EI differ from TE in just that respect which indicates that TE is an empty operator structure. Neither PC nor EI is obviously governed by a QP operator. Thus a general lexical government story about PC and EI is not obviously available. Moreover, while EI, like TE, is limited to copular constructions, PC is not.[14] Thus, there cannot be a TE kind of story about the interpretation, through (copular) predication, of an empty operator of PC. Of course, we could suppose that PC, EI, and TE all shared some other kind of licensing conditions. Such a move, though, would put us in the position described in section 1 above, in which parasitic gap constructions are peculiar.

As I suggested above in 2.2.2, the empty elements in PC and EI are subject to the principles of control. Their distinctive object gaps would be no trouble for the ECP: objects are properly governed. If these object gaps are bound by empty operators, however, licensing problems for the empty operators do arise. The VP conception of PC and EI is not of course without its problems, to which we turn in 4.1. What we have seen here is that there would be problems (though perhaps not insurmountable problems) of proper government in a theory in which PC and EI have empty operators, and in which such empty operators are subject, like non-pronominal empty space in general, to the ECP.

3.3.2 The C&C story We now have principled grounds for choosing the old C&C type of story about parasitic gaps, over, say, a 0-subjacency story. The C&C story is the story that most closely resembles proper government: government of an empty operator by an overt operator. Like the C&C story, the requirement is not here peculiar to parasitic gap constructions. It arises out of general requirements on empty space in syntactic representations.

The present story about parasitic gaps has the familiar consequences of the C&C story: restriction to surface *wh*-movement and the anti-c-command requirement. Restriction to surface (as opposed to LF) *wh*-movement would follow from the Lasnik & Saito (1984) requirement that A-positions must be licensed at S-structure. We must assume that this requirement extends to A-positions within adjuncts, and to operators that bind them. That is, the A-bar positions that can be licensed at LF are limited simply to adjunct constituents themselves.[15]

The anti-c-command requirement, as Chomsky (1986) notes, may be empirically wrong, and hence, a problem for a C&C type of account. If it is in fact the case that the anti-c-command condition must be given up, then the choice of an alternative account of parasitic gap constructions is a more serious matter in the present account than it is in *Barriers*.

Unlike the C&C account, there is here no motivation for functional determination of empty categories. PG are simply variables in empty operator constructions. Thus, the cogent arguments of Brody (1984) against functional determination do not compromise the present account.

Clark (1985) conceives of the empty operator in the parasitic gap construction as a pure A′ anaphor, which is required by the generalized binding theory he assumes to be A′ bound within the domain of its governor. The domain in which the empty operator must be bound turns out to be the matrix S′, and Clark's theory turns out to be similar to the old C&C theory and the present theory in this respect. Since the underlying assumptions of the present theory and Clark's theory differ, ECP vs. generalized binding, it is interesting to see that the two end results for parasitic gap constructions are so similar. There is a sense, however, in which Clark's theory is a theory of parasitic gap constructions, since, in Clark's theory, other empty operator constructions have a different licensing condition, essentially predication. Thus, Clark, too, is in the predicament outlined in section 1: There should be no theory of parastic gaps, yet the parasitic gap construction is apparently peculiar in his theory.

4. Some consequences

PC and EI failed several *wh*-movement tests in section 2. Nevertheless, PC and EI seem to act in some ways like *wh*-movement structures. It is to consideration of possible alternative accounts of these cases that we now turn.

4.1 Untensed bridges

Although PC and EI fail to license their gaps across tensed bridge verbs (as was shown in section 2.2.1, (7)), their gaps can be licensed at some depth into untensed clauses.

(17) a. IR that's a good book to try to learn to read e
b. PG this is the man John interviewed t before telling you to give the job to e
c. TE i. that article's too insignificant to expect you to read e
ii. that article's well-written enough to expect you to read e
d. PC I brought it to try to persuade John to read e
e. EI that article will be tough to expect them to to learn to read e

The possibility of embedding the PC and EI gap within an untensed clause is a problem for the "passive" analysis of them, since true morphological passives do not work at such distances.

(18) * the harmonica$_i$ was tried [PRO to learn t_i]

There is a fairly simple "solution" to this problem, however this solution

raises two important issues. I will suggest the "solution" and then discuss the problems it creates.

4.1.1 A solution One way around the difficulty presented by untensed bridges might be offered by the assumption that the empty element in PC and EI differs from the trace in passive. Assume that all categories are specified with respect to their [±anaphoric] and [±pronominal] properties at D-structure, and that these specifications do not change. Since the empty categories in PC and EI do not arise from movement, we might assume that they are generated empty in the base, as empty pronominals. The requirement that they be obligatorily controlled might arise, as was suggested above in section 2.2.2, from the requirement of Full Interpretation. For concreteness, suppose that FI, in English, as opposed to, say, Chinese, is a requirement on sentence-internal recoverability of deletion. FI for Chinese could, on the other hand, be a requirement on "discourse-internal" recoverability of deletion (cf. Huang (1984)).

In this conception of things, the morphological passive cannot operate at a long distance because of the familiar status of its trace as an empty anaphor. As such, it must be bound within its clause.

(19) a. [Mary$_i$ was kicked [t [+a]] $_i$]
b. * The harmonica$_i$ was tried [PRO to learn [t [+a]] $_i$]

Suppose, on the other hand, that the empty category of PC and EI cannot, as a pronominal element, be bound within its minimal CGC, but must, like PRO, pick up an antecedent within a wider domain.

(20) a. PC i. I brought it$_i$ [to read [e [+p]] $_i$]
ii. I brought it$_i$ [to try [PRO to read [e [+p]] $_i$]]
iii. I brought it$_i$ [to try [PRO to persuade John [PRO to read [e [+p]] $_i$]]]
b. EI i. that article$_i$ will be tough [to read [e [+p]] $_i$]
ii. that article$_i$ will be tough [to expect them [PRO to read [e [+p]] $_i$]]
iii. that article$_i$ will be tough [to expect them [PRO to learn [PRO to read [e [+p]] $_i$]]]

4.1.2 Problems

4.1.2.1 The domain of control The domain in which the empty element of PC and EI must find an antecedent is still the CFC immediately superordinate to PC and EI, but it is no longer in any obvious way the CFC immediately superordinate to the CFC containing the empty element itself. Various possibilities exist for recharacterizing the domain in which the empty element must find an antecedent, however at the present time no one of them seems to me to be obviously superior to the others.

4.1.2.2 The empty element in PC and EI There is no longer the relationship of direct government between the head V of the subjectless VP and

the Caseless position that gave rise to the empty element in PC and EI in the first place. In Jones (1985b) I speculated on an account of this long distance, non-*wh*-dependency that involved percolation of a [-CASE] feature down through the embedded infinitival complements, much like, though certainly not as principled as, the SLASH feature account of long distance dependencies of Generalized Phrase Structure Grammar (cf. Gazdar, Klein, Pullum, & Sag (1985)). Within such an account, a notion of "percolation domain" might be defined that could help in dealing with issue (i). At the present, however, any GB-internal account of such a dependency would have to be cut from whole cloth.

The present theory, then, substitutes one problem for another. However, the two problems differ. We have substituted for a conceptual problem an independently motivated problem of execution. On one hand, the parasitic gap phenomenon poses the conceptual challenge of devising a theory in which the possibility of such an exotic creature is anticipated by general principles. On the other hand, PC and EI pose the problem of characterizing the nature of a long-distance discontinuous dependency distinct from *wh*-movement. There independently exists in GB theory the need for a general theory of a kind of discontinuous dependency distinct from *wh*-movement: a theory of control constructions. PC and EI can be added to the list of non-*wh* empty element constructions for which a general account is needed. In this article, we solve the conceptual parasitic gap problem by (i) making empty operator licensing subject to the ECP and by (ii) establishing PC and EI as problems for Control theory.

The central problem for Control theory has frequently been seen to concern solely the conditions on the occurrence and possible referential dependence of an empty subject argument in an infinitival construction. This emphasis on the empty subject is common to many frameworks. (For recent discussion presupposing the standard empty-subject bias of control theory, see Bresnan (1982), Chomsky (1981), Dowty (1983), Gazdar et al. (1985), among others.) The foregoing demonstrations that a VP account of PC and EI gets some interesting facts about their internal properties for free suggest that the general characterization of Control, with its many aspects, e.g., the empty elements involved, the possible antecedents, the domain of application; should not be limited simply to a theory of an empty subject argument.

4.2 PC, EI and parasitic gaps

One of the standard arguments in favor of an empty operator structure for PC and EI is that they themselves license parasitic gaps. The logic of this kind of argument illustrates the Fallacy of the Undistributed Middle.

(21) a. Fish live in water.
Whales live in water.
Whales are fish.

b. *Wh*-movement structures license parasitic gaps.
PC and EI license parasitic gaps.
PC and EI are *wh*-movement structures

4.2.1 Varieties of PG It is true that all of the constructions we have been considering seem to license parasitic gaps of a sort.

(22) a. IR here's an article [to throw t away without reading e]
b. PG ? that's the tax return I lied about t [after filing e without reading e][16]
c. TE i. this article is too important [to throw t away without reading e]
ii. this article is inconsequential enough [to throw e away without reading e]
d PC we put it over there [to throw t away without reading e]
e. EI that article will be tough [to throw t away without reading e]

However, the PC and EI constructions do demonstrably poorly on one of the very operator-variable tests in *Barriers* that made such a convincing case in favor of an empty operator structure for parasitic gap constituents in the first place: the Comp-to-Comp tensed bridge verb test.

(23) a. RC that's the article I threw t away without telling John he should read e
b. TE i. this article is too important to throw t away before telling John he should read e
ii. this article is inconsequential enough to throw t away before telling John he should read e
c. PC * we put it over there to throw t away without telling John he should read e
d. EI * that article will be tough to throw t away without telling John he should read e

Control relations apparently obtain within a domain that is more restricted than that which is comprehended by *wh*-movement. The parasitic gaps licensed by PC and EI, whose empty elements are by hypothesis interpreted by control, are apparently restricted to the domains in which PC and EI are controlled. Consider once again the phenomenon of control into embedded infinitival complements. Since both PC and EI can have gaps controlled within embedded infinitival complements, parasitic gaps within such complements are much better than their counterpart gaps in tensed complements in (23).

(24) a. RC that's the article I threw t away without telling John to read e
b. TE i. this article is too important to throw t away before telling John to read e
ii. this article is inconsequential enough to throw t away before telling John to read e
c. PC we put it over there to throw t away without telling John to read e
d. EI that article will be tough to throw t away without telling John to read e

4.2.2 Generalized parasitic gap licensing Apparently, operator-variable constructions can give rise to dependencies with operator-variable properties, while control constructions can give rise to dependencies with control properites. The correspondence between the possible kinds of parasitic gaps and the constructions that license them suggests

that the parasitic gap phenomenon itself can be generalized: δ-dependencies allow parasitic δ-dependencies, where δ is a certain kind of dependency, operator-variable, controller- controllee, or, perhaps, even some other kind of dependency.[17]

(25) $\ldots\alpha\ldots\beta\ldots e\ldots,$

$[_\delta\ \alpha_i, \beta_i] \rightarrow [_\delta\ \alpha_i, e_i],$
$\delta \in \{[\text{operator}_i, \text{variable}_i], [\text{controller}_i, \text{controllee}_i]\ldots\}$

Given some kind of dependency between α and β, a dependency between α and a base-generated empty element e can be parasitic on the original dependency. This is essentially the non-story about parasitic gaps in C&C.

Notes

1. The empty operator analysis of PG is much more convincing in the case where the PG is in an adjunct than in the case where the PG is in subject position (cf. Chomsky (1986a: (127) vs. (133)). In this article we will deal only with PG within adjunct constituents, although the account to be developed here of empty operator licensing can be extended straightforwardly to account for empty operator structures in subject position.

2. I include the PRO subjects in (1)-(5) by convention. I will argue below that PC and EI do not, in fact, have PRO subjects.

3. The pronoun/proper name antecedent in the PC in (4) ensures that the infinitive is in fact a purpose clause, and not an infinitival relative. Relatives cannot have pronoun/proper name heads.

4. Denis Bouchard (p.c.) points out that IR, when it is outside a tensed relative clause, apparently cannot have lexical material in Comp.

i. here's the box in which to put your articles that you requested
ii. * here's the box that you requested in which to put your articles
iii. ? here's the box that you requested to put your articles in

It may be, however, that IR in general cannot occur outside tensed relative clauses, and that the infinitive in (iii) is a PC. In order to make sure that we are not getting a PC reading for the infinitive (a reading in which the badness of (ii) would be expected), we must make sure that there is no VP in the sentence with which a PC would be semantically compatible. Thus, (v) should be as bad as (vi), while the goodness of (iii) might be attributed to the goodness of (vii).

iv. here's the bag to put your marbles in that you lost
v. * here's the bag that you lost to put your marbles in
vi. * I lost it to put my marbles in
vii. I requested it to put my articles in

5. The NP in the parenthesized material in (7c,d,e) cannot be the structural subject of the infinitive. Koster & May (1982) is a good summary of the major points of the standard S′ story about the infinitives we are considering here, including an account of why the parenthesized PP constituents in (7c,d,e) must

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be independent PP in spite of the availability of a structural subject position in the S′ infinitive. In the VP theory of PC and EI to be developed in this article, the parenthesized constituent must be an independent PP.

6. A VP analysis of PC and EI is not new. Cf. Brame (1976), Bresnan (1971), among others. What is new here is the possibility that the distinctive object gap in these constructions is a consequence of the VP category.

7. Clark (1984), (1985) has a similar proposal for a perhaps related construction. Clark creates the object gap in an NP like (i) by passive movement.

i. John needs [$_{NP}$ PRO$_i$ a good talking to t_i]

This structure differs in several respects from PC and EI. E.g. PC and EI allow dependencies into untensed clauses, while that in (i) does not (cf. section 4.1).

8. The tests in 2.2.3 do not exhaust the inventory of tests that are supposedly diagnostic of *wh*-movement structures. Embedded infinitives are apparently transparent to PC and EI gaps, a matter we will take up in section 4.1. Furthermore, I have tried "weak" 1-subjacency island tests on these constructions and have not been able to convince myself that any appreciable difference in (invariably marginal) acceptability can be found among them.

In the version of this paper I presented at NELS I argued that passives were impossible in PC and EI, which would be unexpected if these were *wh*-structures. Due to space limitations here, I have left out the discussion of this complex matter. I have discussed this elsewhere, however, in Jones (1985b: III:3.1.1.2, IV:2.2.1.6.1).

9. The sentence in (i), in which there is an aspectual *have* inside an EI, is not too bad. This fact could perhaps be attributed to a kind of parallellism of tenses, since, as we see in (ii) and (iii), the effect disappears with the parallellism.

i. ? John would have been easy to have hired e
ii. * John will be easy to have hired e
iii. * John was easy to have hired e

10. It is of course a consequence of a theory like the VP theory of PC and EI that the *to* in these constituents cannot be the [TNS] element. For an alternative analysis of the *to* in PC and EI as a modal element, see Jones (1985b).

11. *Picked it up* is hardly unique - there are certainly other such VP. For explicit characterizations of the semantic restrictions on the different PC and IOT, see Faraci (1974), Bach (1982), and Jones (1985a).

12. Jane Grimshaw (p.c.) points out that constructions like that in (i) seem to have the characteristics of PC and EI we have noted, incompatibility with bridge verbs, aspectual *have*, etc.

i. that's an easy pan [to fry eggs in]
ii. * that's an easy pan [to tell John that he should use (to fry eggs in)]
iii. * that's an easy pan [to have fried eggs in]

A problem arises for the present VP account of PC and EI if the infinitives in (i-iii) are relatives, since there would be need for an account of these phenomena for *wh*-structures, an account that could be extended to PC and EI as *wh*-structures as well.

It may not be the case, however, that these infinitives are truly relatives. If relatives are optional, the oddness of (iv) is unexplained.

iv. ? that's an easy pan

If, on the other hand, the infinitives are subcategorized VP complements to the *easy*-adjective, their apparent obligatoriness as well as their distinctive syntactic properties follow for free.

13. We will not here decide whether predication occurs at some level prior to LF, as in Williams' (1980) Predicate Structure, or whether it's at some level after LF, say at a level of LF', as in Chomsky (1982: fn 11).

14. PC certainly are not excluded from copular sentences. Bach (1982) notes sentences like *Eyes are to see with*. The important point here is that PC, unlike EI and TE, is not limited to the copular construction. Cf. also Jones (1985c) in which the copular construction containing PC is distinguished from other copular constructions containing infinitives.

15. The account of extractions from adjuncts like PC and EI of Jones (1984) argues for the contrary position, that elements within adjuncts are to be properly governed at LF. This position must be abandoned. There is an alternate account of extractions from PC and EI in Jones (1985b) that does not require this assumption, so there is little to recommend retaining it.

16. Below, in considering PG in embedded clausal constituents, PG-within-PG constructions will be omitted. Relevant examples would involve embedding a gap within the consituent under consideration within an adjunct within another adjunct that contains a PG. I have no subtle intuitions about such contstructions - they all sound impossible.

17. It certainly is not the case that every kind of dependency allows a parasitic dependency. Ken Safir (p.c.) notes that parasitic passive and raising dependencies cannot be allowed. However, these are independently ruled out by the anti-c-command condition. (25) is intended to be the general necessary condition on parasitic dependencies, not the sufficient condition.

References

Bach, E. (1982) "Purpose clauses and control," in P. Jacobson and G.K. Pullum, eds., *The Nature of Syntactic Representation*, D. Reidel, Dordrecht

Brame, M. (1976) *Conjectures and Refutations in Syntax and Semantics*, North Holland, New York

Bresnan, J. (1971) "Sentence Stress and Syntactic Transformations," *Language* 47, 257-81

Bresnan, J. (1982) "Control and Complementation," *Linguistic Inquiry* 13, 343-434

Brody, M. (1984) "On Contextual Definitions and the Role of Chains," *Linguistic Inquiry* 15, 355-380

Burzio, L. (1981) *Intransitive verbs and Italian auxiliaries*, Doctoral dissertation, MIT, Cambridge, MA

Chomsky, N. (1977) "On Wh-movement," in P.W. Culicover, T. Wasow, and A. Akmajian, eds., *Formal Syntax*, Academic Press, New York

Chomsky, N. (1980) "On Binding", *Linguistic Inquiry* 11, 1-46

Chomsky, N. (1981) *Lectures on Government and Binding*, Foris, Dordrecht

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Chomsky, N. (1982) *Some concepts and consequences of the theory of government and binding*, MIT Press, Cambridge, MA

Chomsky, N. (1986a) *Barriers*, MIT Press, Cambridge, MA

Chomsky, N. (1986b) *Knowledge of language*, Praeger, New York

Clark, R. (1984) "Control into NP," Proceedings of WCCFL 3, 40-47, Stanford Linguistics Association, Stanford University, Stanford, CA

Clark, R. (1985) *Boundaries and the Treatment of Control*, Doctoral dissertation, UCLA, Los Angeles, CA

Dowty, D. (1983) "On Recent Treatments of the Semantics of Control," *Linguistics & Philosophy* 6

Faraci, R. (1974) *Aspects of the grammar of infinitive and* for *phrases*, Doctoral dissertation, MIT, Cambridge, MA

Gazdar, G., E. Klein, G.K. Pullum, & I. Sag (1985) *Generalized Phrase Structure Grammar*, Harvard University Press, Cambridge, MA

Gueron, J. & R. May (1984) "Extraposition and Logical Form," *Linguistic Inquiry* 15, 1-31

Huang, C.-T. J. (1984) "On the Distribution and Reference of Empty Pronouns", *Linguistic Inquiry* 15, 531-574

Jones, C. (1984) "Control and extraction from adjuncts," Proceedings of WCCFL 3, 139-148, Stanford Linguistics Association, Stanford University, Stanford, CA

Jones, C. (1985a) "Agent, Patient, and Control into Purpose Clauses," Proceedings of CLS 21.2, Papers from the Parasession on Causatives and Agentivity, Chicago Linguistic Society, Chicago

Jones, C. (1985b) *Syntax and thematics of infinitival adjuncts*, Doctoral dissertation, University of Massachusetts, Amherst, MA

Jones, C. (1985c) "Two BE + infinitival constructions," Proceedings of WCCFL 4, 112-122, Stanford Linguistics Association, Stanford University, Stanford, CA

Koster, J. & R. May (1982) "On the Constituency of Infinitives," *Language* 58, 114-143

Lasnik, H. & M. Saito (1984) "On the Nature of Proper Government," *Linguistic Inquiry* 15, 235-289

Nanni, D. (1978) *The* Easy *Class of Adjectives in English*, Doctoral dissertation, University of Massachusetts, Amherst, MA

Takezawa, K. (1984) "Perfective *Have* and the Bar Notation," *Linguistic Inquiry* 15, 675-687

Williams, E. (1980) "Predication," *Linguistic Inquiry* 11, 203-238